



## Journal of Advanced Research in Applied Sciences and Engineering Technology

Journal homepage:  
[https://semarakilmu.com.my/journals/index.php/applied\\_sciences\\_eng\\_tech/index](https://semarakilmu.com.my/journals/index.php/applied_sciences_eng_tech/index)  
ISSN: 2462-1943



# Potential of Bioresource Usage in The Tropical Area of Southeast Asia for Human Mental Well-Being

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### ARTICLE INFO

#### Article history:

Received 10 October 2023  
Received in revised form 1 March 2024  
Accepted 11 April 2024  
Available online 12 May 2024

#### Keywords:

underutilized; mental well-being;  
phytochemicals; traditional medicine;  
healing practices; evaluation methods

### ABSTRACT

Human health and well-being depend on lifestyle, and current unhealthy lifestyles cause many health problems, including mental health problems. Therefore, people are searching for natural remedies to overcome such well-being problems. Medicinal plants have been used as a primary source of health care and treatments for many diseases. However, recent searching for valuable plants concentrates on human physical well-being. This attention needs to shift to mental well-being as the current limited and poor diet and modern lifestyle adversely affect people's mental health. Southeast Asia consists of tropical countries with abundant bioresources for potential medicinal plants and various food crops. Many underutilized plants have vast marginalized medicinal potentials and have yet to be fully exploited. The traditional knowledge of the application of medicinal plants for mental well-being and in superstitions and healing rituals in Southeast Asia is described in this paper. Scientific exploration of many traditional healing and magic practices in Southeast Asia will benefit in understanding the application of medicinal plants. The incorporation of advanced technologies in detecting beneficial plant compounds from such traditional practices in Southeast Asia will aid humans in finding remedies for modern health problems. This review focuses on the usage of potential plants available in Southeast Asia for human mental well-being and the application of herbals in superstitions and healing rituals.

## 1. Introduction

Southeast Asia's tropical forests are the home for many worlds' recognized medicinal plants. These medicinal plants have been used as a primary source of health care and as treatments for many

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<https://doi.org/10.37934/araset.45.1.189201>

diseases [1]. *Bombax ceiba*, *Acorus calamus* and *Oxalis corniculata* to name a few medicinal plants that have been used traditionally to treat diseases including gastrointestinal disorders [2].

The *Annona muricata* is a tropical plant species which have huge scientifically proven medicinal properties including anticancer, anti-inflammatory, antimicrobial and hypoglycemic activities [3]. As such, many traditionally used medicinal plants currently being investigated to produce plant-based drugs. For example, Vinblastine, a natural alkaloid isolated from the plant *Catharanthus roseus* to treat a number of types of cancer [4]. Natural plant extract for drugs also works well when used together with nanocomposite hydrogel compared with synthetic drugs which give many negative sides effect to the consumer [5]. Phyto-based pharma is booming in recent years as many looking for side-effect free medicines. Plant flower from tropical area that consist of anthocyanin such as *Hibiscus rosa-sinensis* L. *Clitoria ternatea* L. and *Hibiscus sabdariffa* L. are good alternative food coloring compared with widely used cochineal which is from insect *Dactylopius coccus* [6]. Seed of *Citrofortunella microcarpa*, *Hibiscus sabdariffa* and *Artocarpus heterophyllus* widely used in Tropical Area for the oil extraction for the high nutritional value and antioxidant properties [7].

Human health and well-being depend on a sufficiently balanced and secure supply of food. However, due to increase in population and growth of urbanization, agriculture land is rapidly being used for urban development. Food and agricultural systems are vulnerable to a variety of risks, including extreme weather events and climate change, market volatility, and political instability [8]. Approximately 7,000 plant species have been used worldwide in food and agriculture. However, about 30 crops provide up to 95% of the calories in the human diet, among them, four crops account for 60% of the human energy supply [8]. There is a need for new approaches to ensure food and nutrition security. These should be sustainable, resilient, and practical solutions. This paper should be read as an information on the usage of potential plants available in Southeast Asia for human mental well-beings as shown in Figure 1. The application of herbals in superstitions and healing rituals in Southeast Asia will be described suggesting direction for future research.

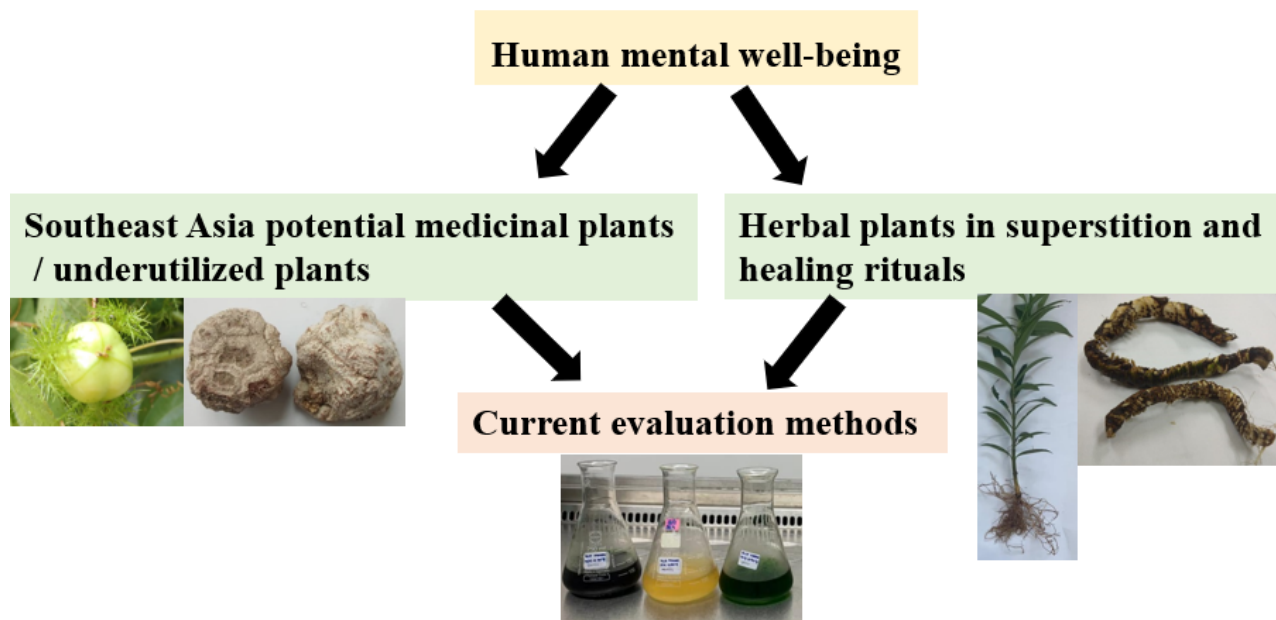


Fig 1. Graphical abstract of human mental well-being and traditional medicinal plants

## 2. Methodology

Online literature review searches were carried out up to September 2021 to compile this review. The data were collected from different databases such as Google, Medline, PubMed, PLOS One, BMC, NCBI, Science Direct, STUARTXCHANGE, Wiley online and other online websites using the following search key terms: Southeast Asia countries, medicinal plants, underutilised plants, ethnopharmacology, mental well-being, healing rituals, magic, natural products, pharmacognosy. However, this search is limited to the data description in three languages; English, Indonesian and Malay languages. Selected plants that are used traditionally and by superstitious practices by the local of Southeast Asia countries for mental well-being are discussed here.

## 3. The Underutilised Traditional Plants and its Potential

The biodiversity in the Southeast Asia especially underutilised plants is essential in addressing the mentioned problems as food and nutritional security. Study from Pacific country demonstrates that traditional local crops such as banana, *pandanus*, breadfruit and yams often have higher nutrition than commonly consumed crops that dominate the marketplace [9]. *Amaranthus*, a widely used green leafy vegetable in Southeast Asia and other countries, contains 200 times more vitamin A and ten times more iron than the same-sized portion of cabbage [10]. Underutilised plants apply to potential and useful plants which are being marginalized and yet to be fully exploit [8]. These plants consist of three characteristics, which are: produced and consumed locally or grown wild, lacking of scientific information on the crop, current market value is relatively low than their potential market value due to the assumption that these plants importance to feed rural poor [8]. Underutilised crops are also rich in nutrients and health-promoting compounds with preventive effects against malnutrition and some chronic diseases. These plants can survive in marginal or stressful conditions as they have a great potential in improving nutrition in local communities [11]. There is increased focus on exploring opportunities to tap the potential of such valuable plant species which have high genetic diversity, low pest-risk, multipurpose use, scope for value addition, well-tuned to traditional farming practices with low inputs, and provide security to rural communities [11]. Scientific exploration through sustainable cultivation methods or extraction processes of these plants able to maximise the nutrients availability from these plants for mankind.

## 4. Human Health and Bioresource Application

In Southeast Asia, it is believed that body is made of different compositions and elements [12] and religious practice can facilitate healing [13]. The diverse beliefs systems and cultural practices of Southeast Asia offer many ways to reach this goal. For example, herbal medicines are used to regulate the natural balance of the body and restore health. In Indonesia, Jamu is the traditional herbal medicine that has been practiced by Indonesian community to maintain good health and to treat diseases [14]. A combination of many herbal plants was used to treat many physical diseases for example, abdominal pain, diabetics, to improve blood circulation and body energy, rheumatism and many more [14]. While in Thailand community, herbal and traditional medicines are being practiced to cure chronic diseases such as cancer, liver disease, diabetes and cardiovascular disease [15].

Physical health is correlated with mental health because good physical health leaves a better personal feeling in the long term. For example, if a chronic illness affects a person's ability to complete their regular tasks, it may lead to depression and stress [16]. Mental disorders are treatable conditions characterized by changes in thinking, behaviour and/or mood that are connected with

distressed and impaired functioning [16]. Gastrointestinal disease, hypertension and other cardiovascular conditions, respiratory diseases, migraine, and allergy conditions are reported to be of higher prevalence to those suffering with anxiety disorders [17]. Mental disorders such as depression, stress, anxiety, and more are global health problem in both developing and developed countries.

A poor dietary pattern and physical inactivity have been associated with risk of mental health disorder [16]. Diet and nutrients intake plays an important role in our health well-being. Apart from already known dietary constituents, in the recent years there is an increasing interest for certain natural compounds for having numerous health benefits which includes phytochemicals. Phytochemicals are biologically active, naturally occurring chemical compounds in plants. These compounds provide potential pharmacological effects on human health including mental and physical health, further than those attributed to micronutrients and macronutrients. Phytochemicals are frequently consumed within the diet, encompassing, polyphenols carotenoids and other terpene-based compounds, phytosterols/phytosterols, lignans, various alkaloids and sulphur-containing compounds [18].

The occurrence of anxiety and anxiety-like disorders involves an organized activity of numerous brain-signaling pathways via different neurotransmitters. Gamma-aminobutyric acid (GABA) is the primary inhibitory neurotransmitter that is responsible to correct the action of the excitatory neurotransmitter glutamate. Imbalance in the brain's chemical (noradrenaline, serotonin, dopamine etc.) leads to many neuropsychiatric disorders and neurodegenerative disorders, such as schizophrenia, depression, Alzheimer's Disease. Apart from the disorders, imbalance of brain's chemicals regulates mood, sleep, appetite and physical activities [16]. A common vegetable consumed in Southeast Asia, *Centella asiatica* was evaluated its anxiolytic properties and reported that the pentacyclic triterpene namely asiatic acid has possible function in modulating of the GABA receptor in male rats [17].

In Southeast Asia, there is widespread acceptance of Traditional, Complementary and Alternative Medicine (TCAM) at the community level. For example, in Thailand, public opts for traditional herbal medicines, herbal steam bath, massages and acupuncture as a remedy for their illness. While in Cambodia, non-prescription herbals are easily available in their market which is used for diseases related to supernatural theory, naturalistic theory and maintenance for body temperature [19]. It's been reported TCAM has been used by 64% among of patients with chronic diseases in Malaysia, 60% among cancer patients in Thailand and 77% among adults with schizophrenia in Cambodia [14,18,19].

Many herbal plants in Southeast Asia have been traditionally used to treat hypertension, anxiety, balance body temperature, anti-inflammation and many more. Table 1 [14-32] shows list of underutilized plants in Southeast Asia countries and their traditional usage for mental well-being. For example, in Indonesia *Elateriospermum tapos*, *Syzygium polyanthum*, *Guazuma ulmifolia* and *Dioscorea hispida*) are used in the form of remedy drink, salad or food by locals to treat hypertension [14]. Same goes in Cambodia and Philippines, local herbs such as *Acacia pennata*, *Oroxylum indica*, *Blumea balsamifera*, and *Jussiaea erecta* are used to treat headaches and hypertension. While in Malaysia, apart from herbal plants are consumed to relax mind from depression and stress, plants are traditionally consumed to alter body temperature and energy. For example, *Tinospora crispa* and *Smilax calophylla* plants are boiled and decoction before consumed it to regulate body temperature as shown in Table 1 [20, 21]. Increase in body temperature can have significant effect on mental health and behaviour. As the body temperature increases, people may feel loss of concentration and ability to do mental task as well as increase irritability and stress [21]. Many use supplements including herbals to boost their energy and cognitive health. By boosting body energy level, it can

stimulate mental alertness, memory and mood. In Thailand, *Kaempferia parviflora* which is known as Thai ginseng or locally "Krachai dam" is an herb used from ancient time to boost testosterone hormone. Despite it is famously known for sexual enhancement in men, *Kaempferia parviflora* contains flavonoid that was reported to possess neuroprotective effects, and cognition-enhancing effects [18].

Thus, human health is highly depending on diet and other lifestyle factors. Traditional plants contain phytochemicals that benefits human health and well-being as describe above. However, lack of scientific evidence for its benefit and marketing has left these plants remain underutilised. The identification of these phyto compounds to treat diseases as mentioned in this study is highly encouraged, as it can optimize the use of these medicinal plants at larger scale.

**Table 1**

List of underutilised plants in Southeast Asia countries and their traditional usage for mental well-being

Country	Coordinates	UNP (Scientific name)	Local name	Traditional used	References
Malaysia	4.2105° N, 101.9758° E	<i>Phaleria macrocarpa</i>	Mahkota Dewa	Vasorelaxant, hypertension	[21]
		<i>Zingiber spectabile</i>	Tepus	Treatment for headaches and back pain	[20]
		<i>Smilax calophylla</i>	Rancang Tembaga	General health tonic	[20]
		<i>Tinospora crispa</i>	Petawali	Hypertension, cooling down body temperature	[21]
		<i>Passiflora foetida</i>	Buah Leletup	Stress, anxiety, depression, insomnia	[28]
		<i>Acorus calamus</i>	Jerangau	Have the ability to calm the mind	[21]
		<i>Euphorbia hirta</i>	Tawa-tawa	Relaxing agent, to treat insomnia	[20]
		<i>Ficus deltoidea</i>	Mas Cotek	Headaches, migraine	[21]
		<i>Abrus precatorius</i>	Akar Saga	Treat mental illness or insanity	[28]
		<i>Etilingera elatior</i>	Bunga Kantan	Hypertension	[20]
Cambodia	12.5657° N, 104.9910° E	<i>Acacia pennata</i>	Cha-om, pak lat	Headaches	[25]
		<i>Lasia spinosa</i>	Pak nam	Antioxidant, antinociceptive	[25]
		<i>Piper sarmentosum</i>	Japloo	To treat hypertension, headache, antinociceptive	[19]
		<i>Trevesia palmata</i>	Tang	Abdominal pain, physical recovery	[19]
		<i>Bombax ceiba</i>	Roka	Act as stimulant, aphrodisiac	[19]
		<i>Oroxylum indica</i>	Pika	Anti-inflammatory, digestive impairment, headache	[19]
		<i>Dendrocalamus giganteus</i>	Rusai prei	The siliceous secretion of the culm is considered aphrodisiac and tonic	[19]
Indonesia	0.7893° S, 113.9213° E	<i>Caryota mitis</i>	Tunsaé töch	To treat gastric ulcers, migraine headaches,	[19]
		<i>Elateriospermum tapos</i>	Tapos	Hypertension	[32]
		<i>Syzygium polyanthum</i>	Daun Salam	Hypertension	[14]
		<i>Salacca sumatran</i>	Salak; Pondoh	Memory booster, antioxidant, anti-inflammatory	[32]
		<i>Amorphophallus paeoniifolius</i>	Suweg	Decrease in locomotor activity	[32]
		<i>Guazuma ulmifolia</i>	Jati Belanda	Hypertension, vasorelaxant	[14]
		<i>Artocarpus elasticus</i>	Terap	Anti-inflammatory	[24]
		<i>Dioscorea hispida</i>	Gadung	Anti-inflammatory, inhibiting hypertension	[32]
<i>Canna indica</i>	Sebih Putih	Relieves fever	[24]		

Thailand	15.8700° N, 100.9925° E	<i>Ziziphus oenopolia</i>	Leb meaw	Edema following sprains or tendonitis	[18]		
		<i>Clausena excavata</i>	Huaat maawn	Cooling effect for fever, nootropic, cerebral protective activity	[18]		
		<i>Garcinia dulcis</i>	Maphuut	Detoxification, anti-inflammation	[30]		
		<i>Aegle marmelos</i>	Matoom	Healing digestive disorder, anti-inflammation	[30]		
		<i>Kaempferia parviflora</i>	Krachai dam	Energy booster, cognitive improvement	[18]		
		<i>Archidendron jiringa</i>	Luk-nieng	Relieves symptoms of diabetes	[30]		
		<i>Muntingia calabura</i>	Ta khop farang	Remedy for headache, antidyspeptic	[30]		
		Myanmar	21.9162° N, 95.9560° E	<i>Plantago major</i>	A-kyaw-baung-tha-thaung	Hypertension, anti-inflammation	[25]
				<i>Dichrocephala integrifolia</i>	Sein-zar-myat-lone	Alzheimer's disease	[25]
<i>Telosma cordata</i>	Gwe-tauk			Mental disorder	[25]		
<i>Rothea serrata</i>	Bebya, Hin-byar			Mental disorder	[25]		
<i>Taxus baccata</i>	Kyauk-tinyu			Sedative, headache, giddiness, nerves	[26]		
<i>Rauvolfia serpentina</i>	Bomma-yaza			Anxiety-related palpitations, hypertension, sleeping aids, to calm aggression	[26]		
<i>Artemisia dracunculus</i>	Dona-ban			Mildly sedative as is used to aid sleep, hypnotic, nociceptive	[26]		
<i>Blumea balsamifera</i>	Bonmathane-payoke, Phone-ma-thein			Sedative, hypotensive, used to relieve excitement and insomnia	[26]		
<i>Cullen corylifolium</i>	Babchi, nehle			Aphrodisiac, stimulant, tonic, anti-depression	[26]		
Philippines	12.8797° N, 121.7740° E	<i>Flemingia chappar</i>	Bahon, gyo-pan	Used to treat insomnia	[26]		
		<i>Blumea balsamifera</i>	Sambong, nagal champor	Kidney problems, lumbago, and rheumatism	[27]		
		<i>Illigera luzonensis</i>	Lagitik	Remedy for headache, hypertension	[27]		
		<i>Leea Manillensis</i>	Abang-abang	Relieving hypertension	[27]		
		<i>Adenantha intermedia</i>	Kares, Alalangat	Headaches	[27]		
		<i>Crotalaria sessiliflora</i>	Pitpitit	Headaches	[27]		
		<i>Indigofera tinctoria</i>	Tina-tinaan/ tugum	Nervous disorder	[27]		
		<i>Atuna racemosa</i>	Tabon Tabon	Relieving hypertension	[27]		
		<i>Jussiaea erecta</i>	Pasau	Headache, nervous disorder	[27]		

## 5. Application of Herbal Plants in Superstition and Healing Rituals

Plants have been used in early civilization for curing diseases, warding off misfortune, to cure or to curse and appeasing the gods. In fact, in Southeast Asia the beliefs in traditional medicine for curing and healing diseases due to spiritual causes are still widely practiced among the locals as they believed the spirit possession and black magic are to be blamed compared to mental illnesses. Table 2 [15-34] represents example of plants used in selected Southeast Asia countries for their superstition's practices and healing rituals. Indonesia is famously known for supernatural power practices and their traditional healer known as dukuns or shamans. Dukuns are traditional healers who work with divine energy to treat physical and mental illnesses, remove spells and channel energy from ancestors. They treat their patients with four methods of treatment. That are decoctions (jamu, aroma therapy, and gurah,) [14, 24], skills with tools (acupuncture, cupping, and acupressure), skills without tools (massage, fracture treatment, and reflection), and skills using mind (hypnotherapy, meditation, and inner energy power) [22]. It is believed among the healers that *Piper betle* leaves able to find the source of illness when it attached to the patient's body as shown in Table 2 [22]. *Acorus calamus* with other plants and objects has been used to chase away evil spirit as shown in Table 2 [23]. This rhizome has strong aroma and modern study has proved that this rhizome has anti-inflammatory as well as the analgesic and antipyretic effects [23]. Thailand is also famous for its black magic used in the form of amulets and healing ritual by taking herbal bath and herbs amulets.

Missing tribe in Assam used many plants in superstition practices that have medicinal value. For example, this tribe believe *Acorus calamus L.* rhizome can chase away spirits and devils due to its odour [23]. They placed this rhizome at the four corners of the altar or at the entrance of the ritual site. Such practices also applied in Malaysia, whereby *Acorus calamus* rhizome locally known as Jerangau is used as talisman in healing ritual as well as drink to calm the mind as shown in Table 1 [21]. Currently, scientific evident shows that this plant can cure bronchitis, rheumatic pain, flatulence, diarrhoea, pneumonia and flue [21].

## 6. Current Evaluation Methods for Human Physical and Mental Health from Plant Components

Plants have been used for medicinal purposes long before prehistoric period [25]. Based on the ancient medicine practices, there are many plants or herbal formulations which provides a guide for modern medicine for the identification of new compounds or a source of alternative medical therapy and it is receiving scientific attention recently. Besides that, inadequate supply of drugs, side effects of several synthetic drugs and development of resistance to currently used drugs for infectious diseases have led to increase emphasis on the use of plant materials as a source of medicines for a wide variety of human ailments in Southeast Asia as shown in Table 2 [25-27]. Treatment with medicinal plants is considered very safe as there is no or minimal side effects [25].

Pre-clinical study is important for elucidation of pharmacodynamics characteristic of the compounds and their implication for possible toxic effects of the compounds and metabolic effects in animals as a guide to these characteristics in humans [25]. Pre-clinical study either via *in vivo* or *in vitro* studies have provide evidence that plant compounds are highly potential for new drug discovery. Cancer, osteoporosis [31] inflammatory [28,30] and obesity are few example diseases whereby pharmacologically active herbals have been identified as prevention and remedy for the diseases [25-28].



**Table 2**

List of underutilised plants in Southeast Asia countries and their traditional usage for superstitions and healing rituals

Country	UNP (Scientific name)	Local name	Traditional used	References
Malaysia	<i>Costus speciosus Smith.</i> <i>Costaceae</i>	Tabar Tabar	Leafy branch used as healing wand and to chase away spirits	[33]
	<i>Goniothalamus macrophyllus</i>	Penawar Hitam	Bark burnt as incense in healing and other rituals	[33]
	<i>Dianella ensifolia</i>	Siak-siak	Roots mixed with resin of <i>Styrax</i> and used as incense in healing and other rituals	[33]
	<i>Styrax benzoin</i>	Kemayan	Resin mixed with roots of <i>Dianella</i> used as incense in healing and other rituals	[33]
	<i>Timonius wallichianus</i>	Pokok Pembenci	Cure the interference of jinn and magic	[33]
	<i>Orchidantha longiflora</i>	Lobak Hutan	Leaves used in healing and other rituals	[33]
	<i>Plumeria obtusa L.</i> <i>Apocynaceae</i>	Kemboja	Flower used in healing and other rituals	[33]
	<i>Tagetes patula</i>	Bunga Tahi Ayam/ marigolds	Flower used in healing and other rituals	[33]
	Thailand	<i>Mimosa pudica L</i>	Kra thuep yot	To ward off evil spirits
<i>Zephyranthes carinata</i>		Pang Klua	To protect the owner from evil spirits	[15]
<i>Hippeastrum johnsonii</i>		Wan-see-til	Used to protect against evil spirits	[15]
<i>Mimusops elengi</i>		Phikun	Misfortune will occur to the owner	[35]
<i>Caladium bicolor</i>		Koson	To treat pain from evil black magic	[15]
<i>Sansevieria trifasciata</i>		Waan hang suea	To protect from evil spirits	[15]
<i>Canna Sp.</i>		Phutaraksa	Keep away the evil spirits	[24]
<i>Diospyros packmanil</i>		Chan	Misfortune will occur to the owner	[35]
Indonesia	<i>Phyllanthus distichus euphobiaceaea</i>	Mayom	To chase away evil spirit	[35]
	<i>Moringa oleifera</i>	Daun Kelor	To treat pain from evil black magic	[15]
	<i>Sacharum Offcinarum</i>	Tebu Hitam	To treat pain from evil black magic	[15]
	<i>Impatiens balsamina</i>	Pacar Air	Used to protect against evil spirits	[15]
	<i>Piper betle</i>	Daun Sirih	To attached on the skin to find the source of illness. To make concoction oil.	[22]
	<i>Kaempferia galanga</i>	Sekur / Kencur	To make concoction oil for black magic	[22]

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	<i>Bougainvillea spectabilis</i>	Kembang Kertas	Bathing ritual for protecting/covering people from illness	[22]
Philippines	<i>Acorus calamus</i>	Lubigan	Stem is pinned on baby's clothes to drive away evil's spirits	[23]
	<i>Blumea balsamifera</i>	Lakad Bulan	Used to treat <i>Pasma/Surip</i> from interaction of hot and cold elements	[23]
	<i>Agathis philippensis</i>	Almasiga / Dayungon	Used in the rituals	[23]
	<i>Blumea lanceolaris</i>	Lawi lawi	Used in mystical contagion	[23]
	<i>Moringa oleifera</i>	Kalungay	Used in mystical contagion	[23]
	<i>Artemisia vulgaris</i>	Artamisa	Used in mystical contagion	[23]

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Methodologies of pre-clinical study are crucial to demonstrate the positive effect of plant compounds and their derivatives for the treatment of diseases [231]. Comprehensive preclinical studies reported that plant-derived chemicals like alkaloids, terpenes, flavonoids, phenolic acids, lignans, cinnamates and saponins has anxiolytic effects on various animal models with anxiety [17]. The alkaloids revealed promising biological activities and properties on the treatment of neurodegenerative diseases, which includes antioxidant, anti-inflammatory effects, anxiolytic and antidepressant properties. The isolated compounds are tested both in vitro and in vivo to identify its efficacy. Animal experiment model, mouse/rat is the commonly used in the in vivo preclinical study and mouse strains are chosen according to the research objectives. In anti-tumour activities against melanoma studies, tumour allograft mouse models were fed with aqueous extract and its survival days were counted [29]. While in vitro anticancer study, MTT assay was conducted on melanoma cancer cells after treated with aqueous extract [29]. Generally, phyto compound effectiveness on human physical health are studied by using transgenic animal model feed with phyto compounds and human cell lines treated with plant extract.

Mental health is evaluated by human behaviour and brain capability. The efficacy of phyto compounds on mental health analysis is rather challenging as it is involved observation experiments. The major issue of observational evidence is that it is known to have internal validity as it is subjected to bias and confusing [20,25,28]. However, observational studies are useful methods for analysing the mouse behaviour to evaluate brain processes. In pre-clinical studies of mental health, mice are fed with phyto compounds and their changes in behaviour are observed. In cognitive impairment study, mice were fed with phyto compounds for almost a month and their cognitive and behaviour were measured by locomotor activity, motor coordination, passive avoidance test and object recognition test, Morris water maze test and elevated water maze [31]. Extracted brain tissue also used in the histopathological and immunohistochemical analyses to view effect of phyto compound on brain tissues [25].

Phyto compounds evaluation methods are highly depending on pre-clinical study on animals to assess the safety and efficacy of phyto compounds. Implementation of advance technology such as supercomputer to screen naturally occurring compounds that have computational potential for efficacy against any human diseases will add advantage in finding future drug.

## **7. Conclusion**

Diet and health are interconnected and health require healthy and nutritional foods. Southeast Asia biodiversity offers many new varieties of medicinal plants or crops that have been consumed by locals for centuries. Besides that, many plants have been used in rituals with believe they can heal many diseases and to ease the spirits. This ancient or traditional knowledge can be valuable in finding remedy for modern diseases which influence by current hectic lifestyle. Even though many researches have been conducted in medicinal plants in Southeast Asia, we are unable to gather all the generated data from "omics" studies that usually too huge to be analyzed by conventional methods. Exploring new insights from traditional practices in usage local plants and its benefits requires development of advance methods in information technologies and machine learning such as supercomputer and artificial intelligence.

## **Acknowledgement**

The authors would like to express their deepest gratitude to Delightex Pte. Ltd. and Universiti Teknologi Malaysia for funding this research study under the grant number of R.K130000.7343.4B603. The basic laboratory facility was supported by Delightex Laboratory at

Malaysia-Japan International Institute of Technology, Universiti Teknologi Malaysia, 54100 Kuala Lumpur, Malaysia.

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